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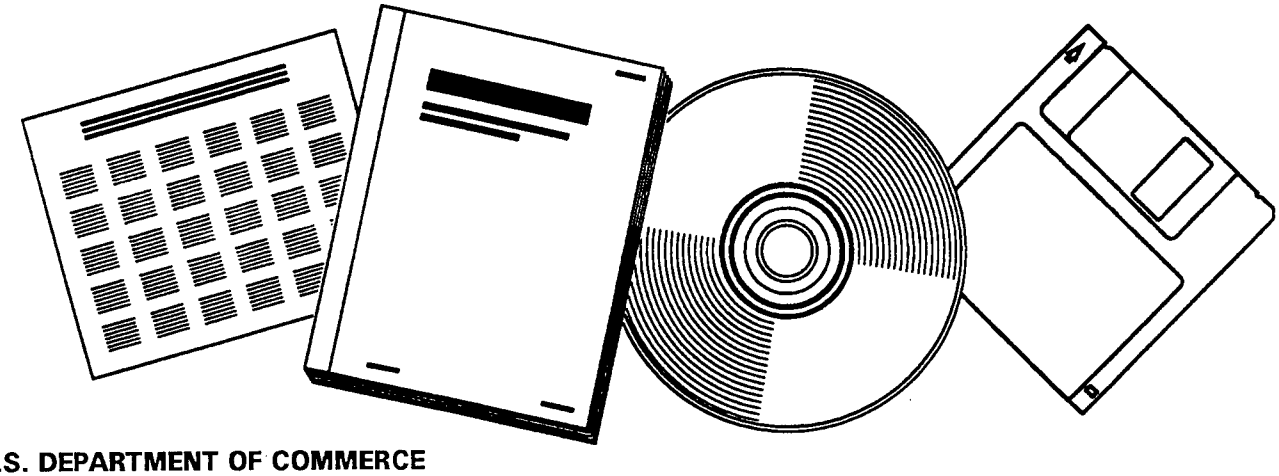
ENVIRONMENTAL ASSESSMENT OF THE SALE OF NATIONAL DEFENSE RESERVE FLEET VESSELS FOR SCRAPPING

JUL 97



U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

ENVIRONMENTAL ASSESSMENT OF THE SALE OF NATIONAL DEFENSE RESERVE FLEET VESSELS FOR SCRAPPING

Prepared by:

The Maritime Administration

U.S. Department of Transportation

Report No. MA-ENV-820-96003

U.S. Department of Transportation

Maritime Administration

JULY 1997

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The environmental assessment (EA) was prepared by the Maritime Administration (MARAD) of the U.S. Department of Transportation (DOT) to analyze the environmental effects of MARAD's proposed action to sell approximately 65 obsolete ships from the National Defense Reserve Fleet (NDRF) for scrapping. While there may be some local impacts on air, water, and biotic resources in the immediate vicinity of the scrapping sites, they will be consistent with existing use patterns. The environmental conditions at these sites would not noticeably change during the period in which MARAD's ships are scrapped.

This EA considers three alternatives; 1) scrapping the vessels domestically; 2) scrapping the vessels in foreign countries; and 3) no action.

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EXECUTIVE SUMMARY

This environmental assessment (EA) was prepared by the Maritime Administration (MARAD) of the U.S. Department of Transportation (DOT) to analyze the environmental effects of MARAD's proposed action to sell approximately 65 obsolete ships from the National Defense Reserve Fleet (NDRF) for scrapping. This assessment fulfills the requirements of the National Environmental Policy Act (NEPA), the implementing regulations of the Council on Environmental Quality, Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*, DOT Order 5610.1C, and Maritime Administration Order 600-1.

To comply with the National Maritime Heritage Act (NMHA) of 1994, MARAD must sell for scrapping approximately 65 ships from the NDRF by September 30, 1999. MARAD proposes to offer the ships for sale through open Invitations for Bid (IFB), which would allow the purchaser to scrap the vessel(s) either in the United States or in a foreign nation in compliance with the terms of the Environmental Protection Agency's (EPA) Enforcement Letter of November 30, 1995.

While there may be some local impacts on air, water, and biotic resources in the immediate vicinity of the scrapping sites, they will be consistent with existing use patterns. The environmental conditions at these sites would not noticeably change during the period in which MARAD's ships are scrapped. In the case of foreign scrapping, ships received from MARAD's NDRF generally represent only a small part of the total operations; moreover, all hazardous materials that are not a part of the ship's structure and all polychlorinated biphenyls (PCBs) in concentrations of 50 parts per million (ppm) or greater, with the exception of applied oil-based paint, and possibly petroleum (in the form of fuels), are to be removed in the U.S. Positive impacts resulting from scrapping the vessels will include socioeconomic benefits to the surrounding communities and a supply of steel that requires less energy to reprocess than producing steel from raw materials.

This EA considers three alternatives: 1) scrapping the vessels domestically; 2) scrapping the vessels in foreign countries; and 3) no action. While MARAD has authority to sell vessels for non-transportation uses or to donate vessels to be used for other purposes such as fish reefs or museums, these options are not responsive to the MARAD's statutory mandate under the NMHA and, therefore, are not considered in this EA. Any of the alternatives presented in this EA, if implemented, would not be considered a major federal action that would significantly affect the quality of the human environment and would not require the preparation of an Environmental Impact Statement. However, only the first two alternatives adequately address MARAD's mandate under the NMHA and would provide the greatest degree of economic and environmental benefit when compared with attendant risks.

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CHAPTER I
PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is to implement Section 6(c) of the NMHA, 16 U.S.C. § 5405(c). This section directs the Secretary of Transportation by September 30, 1999, to dispose of all vessels in the NDRF that are not assigned to the Ready Reserve Force (RRF) and that are not specifically authorized or required by statute to be used for a particular purpose. Acting through MARAD, the Secretary of Transportation proposes to dispose of the 60 to 70 ships that are included within this statutory directive.

In a memorandum dated November 18, 1993, MARAD concluded that the ship scrapping program as a whole warrants an environmental review. Accordingly, this EA has been prepared in order to assess the potential environmental impacts resulting from implementation of the NMHA, as it pertains to MARAD's actions, and to determine whether an environmental impact statement (EIS) is warranted. This EA conforms with the National Environmental Policy Act (NEPA), the implementing regulations of the Council on Environmental Quality, Executive Order 12114, *Environmental Effects Abroad of Major Federal Actions*, DOT Order 5610.1C, and Maritime Administration Order 600-1.

Section 6(c) of the NMHA applies only to MARAD. Other sections of the act describe actions to be taken by other federal agencies. Environmental impacts resulting from the actions of other federal agencies are beyond the scope of this EA.

This EA presents the following proposed alternatives available to MARAD in disposing of the ships.

- Alternative 1 - Selling the ships for domestic scrapping.
- Alternative 2 - Selling the ships for scrapping abroad after removal of hazardous material domestically.
- Alternative 3 - The no-action alternative, continuation of current management.

This EA is programmatic and does not analyze specific ships or particular ship breaking/recycling facilities. Ship breaking/recycling sites in the lower-48 states will likely be in estuarine areas on all three coasts and foreign ship breaking/recycling locations are expected to be on the Mexican Gulf Coast, the coast of China, or the northwestern coast of India. The no-action alternative would necessarily take place at MARAD's NDRF sites.

There are no other environmental assessments or environmental impact statements that influence the scope of this EA. There are, however, seven reports relevant to this EA. They are provided as the following appendices.

- MARAD Report, *The Legal Environment for Environmentally Compliant Ship Breaking/Recycling in the United States* (Appendix A)

- MARAD Report, *Substantive Law on Environmentally Compliant Ship Breaking/Recycling in the United States* (Appendix B)

- MARAD Report, *Current and Advanced Technologies for the Ship Breaking/Recycling Industry* (Appendix C)

- MARAD Report, Sampling and Analysis (Appendix D)

- MARAD Report, *Survey of Ships and Materials* (Appendix E)

- MARAD Report, *The Markets, Cost and Benefits* of Ship Breaking/Recycling in the United States (Appendix F)

- MARAD Report, *Environmental Analysis of the Maritime Administration Ship-Disposal Program*, August 1994 (Appendix G)

CHAPTER II
BACKGROUND ON MARAD'S SHIP SCRAPPING PROGRAM AND SHIP SCRAPPING IN GENERAL

MARAD'S SHIP SCRAPPING PROGRAM

This section discusses the structure of MARAD's fleet, MARAD's authority to dispose of vessels and the Agency's mandate under the NMHA.

The National Defense Reserve Fleet:

Section 11 of the Merchant Ship Sales Act of 1946, 50 App. U.S.C. § 1744, created the NDRF of inactive but potentially useful merchant ships, which may be activated to meet shipping needs during national emergencies. In 1976, the NDRF was divided into two divisions: (1) the Ready Reserve Fleet (RRF) consisting of ships maintained in a condition that would allow them to be activated within 4, 5, 10, or 20 days, and (2) a non-Ready Reserve Fleet (non-RRF) consisting of ships that receive minimal maintenance and would require 30 to 120 days to be activated.

Currently the NDRF consists of 220 ships: 93 RRF and 127 non-RRF. Most of these ships are located at one of three reserve fleet sites: the James River Reserve Fleet (JRRF), the Beaumont Reserve Fleet (BRF), and the Suisun Bay Reserve Fleet (SBRF). The remaining ships are outported at various locations. All three fleets are similar in organization. Ships are anchored in rows in a bow-to-stern fashion. Ships of the same type and size are usually anchored together.

MARAD's Authority to Scrap Vessels:

Sections 508 and 510 of the Merchant Marine Act (MMA), 1936, as amended, 46 App. U.S.C. §§ 1158, 1160(I), are the source of MARAD's authority to sell surplus reserve fleet vessels. Section 508 provides that vessels acquired by MARAD that are determined to be of insufficient value for commercial or military operation to warrant their further preservation may be sold for scrap or for operation, provided such operation is not in competition with any other U.S. flag vessel in foreign commerce owned by a U.S. citizen. Section 510(j) provides that all vessels acquired by MARAD shall be placed in the NDRF, and shall not be traded out or sold except as provided in section 510(g) and 510(I) of the MMA. 46 App. U.S.C. §§ 1160(g), 1160(I). Section 510(g) prohibits the use of obsolete reserve fleet vessels for commercial operation by the Government. Section 510(I) allows MARAD to sell obsolete vessels and place the money in the Vessel Operations Revolving Fund (VORF).

These statutes authorize only the following types of sales of obsolete vessels: sales for scrapping or, sales for non-transportation use. There has not been a sale for non-transportation use since 1981. MARAD also has authority under Public Law 92-402 (as amended by Public Law 98-623) to donate ships that would otherwise be scrapped (16 U.S.C. §§ 1220, et seq.) to states for use as artificial reefs for the conservation of marine life; however, this option would

not maximize proceeds from the sale of the ships nor would MARAD be able to dispose of a large number of ships pursuant to this authority. MARAD requires that all purchasers agree not to resell any ship purchased pursuant to § 508 or § 510(I) of the MMA without the prior written consent of MARAD, and that all the covenants, stipulations and agreements contained in the contract of sale and IFB are binding on the purchaser's successors.

Currently, MARAD's use of § 508 authority to sell ships for scrapping is limited by the requirement of the NMHA that proceeds from the sale of the vessels be deposited in the VORF. Section 508 does not provide a mechanism for or authority to deposit funds in the VORF; therefore, all sales in furtherance of section 6(c) of the NMHA must be made pursuant to § 510(I).

The National Maritime Heritage Act:

The National Maritime Heritage Act accelerated MARAD's normal ship scrapping activities by mandating that the Agency dispose by September 30, 1999 of all vessels in the NDRF after July 1, 1994 that are not assigned to the RRF component of that fleet and are not specifically authorized or required by statute to be used for a particular purpose. In disposing of these ships, the NMHA requires that MARAD (1) maximize the financial return on the vessels to the United States; (2) comply with the DOT plan for disposal of those vessels; and (3) comply with sections 508 and 510(I) of the MMA.

Pursuant to section 6(d) of the NMHA, 16 U.S.C. § 5405(d), funds derived from the sale of obsolete vessels are dispensed to several agencies. Fifty percent of the funds are deposited in the VORF and are available to MARAD for acquisition, maintenance, repair, reconditioning, or improvement of vessels in the NDRF. Twenty-five percent of the funds are available to state maritime academies or the United States Merchant Marine Academy for facilities and training, ship maintenance, repair, and modernization, and for the purchase of simulators and fuel. The remaining 25 percent is available to the Secretary of the Interior to carry out the National Maritime Heritage Grants Program.

The express provisions of the NMHA make clear Congress' intent that the disposal of ships pursuant to section 6(c) generate funds that will be deposited in the VORF and used for the purposes described in section 6(d) of the Act. Indeed, section 6(c) expressly requires that in disposing of the vessels, MARAD ***maximize the return*** on the vessels to the United States. Thus, the NMHA has two key components: 1) to dispose of vessels by 1999, and 2) to maximize return to the Government. In order to comply with this mandate, MARAD is impelled to scrap the vessels; no other alternative will satisfy these two components. Transferring the vessels for use as reefs generates no revenue and demand for reef ships is small. Demand for MARAD vessels for other non-transportation uses is also insignificant, as MARAD has not sold a ship for non-transportation use for fifteen years.

The legislative history of the NMHA likewise indicates that the ships are to be sold for scrap. As Congressman Andrews from Maine indicated during the House debates, "[u]nder this

legislation, all [NDRF] vessels not useful to our government will be scrapped and the proceeds will be used to fund this program and its grants." 140 Cong. Rec. H10791 (1994).

BACKGROUND ON THE SHIP SCRAPPING PROCESS

After removal from the fleet site, a ship is towed to a breaking/recycling yard. A ship may then be scrapped either afloat or in a drydock. Because of costs, scrapping in a drydock rarely occurs. Once the ship reaches the yard, the process may be divided into three phases. First is the preparation phase, in which fuel, other liquids, combustible material and small articles are removed. The propellers may also be removed so that the hulk can be pulled into shallow water where scrapping usually takes place. Insulation, adhesives, and paint are removed manually, where possible, from the surface of the hull where it will be cut. The presence of hard to remove and potentially toxic materials may require more extensive cut-line preparation, such as grit blasting.

Second is the cutting phase, in which the upper decks and the superstructure and systems are first cut, followed by the main deck and lower decks. The cutting is typically done manually using a blow torch, but it may be done with shears, or, for non-ferrous metals, saws. As the weight of the structure is reduced, the remaining hulk floats higher, exposing lower regions of the hull. Large reusable components are removed as they become accessible. Ultimately, the remaining portion of the hull is pulled ashore and cut.

The final phase involves the disposition of materials resulting from the scrapping activity. Scrap metals, including steel, aluminum, copper, copper nickel alloy, and lesser amounts of other metals, are sorted by grade and composition and sold to remelting firms or to scrap metal brokers. How and where large pieces of the ship's hull are cut into smaller pieces for delivery to the purchaser is determined by labor pay rates afloat and ashore, crane capacities, the availability of lay down areas where further cutting can be performed, vessel sizes, railroad siding capacities, and other factors (see Appendix C).

Valuable metals, such as copper in electric cable, that are mixed with useless, non-metal material may be recovered using shredders and separators. The shredders produce a gravel-like mixture of metal particles and non-metal fluff. The metals are then separated from the fluff using magnetic separators, air flotation separator columns, or shaker tables (see Appendix C).

Reusable materials and equipment may be sold directly with little or no refurbishment by the scrapping yard. Ship propulsion machinery certified by a recognized organization, such as the American Bureau of Shipping, can be resold for use in other ships.

Other materials that are not recycled, including hazardous materials and other wastes, are disposed of in accordance with the laws and regulations of the country in which the vessels are scrapped, including U.S. laws in the case of domestic scrapping.

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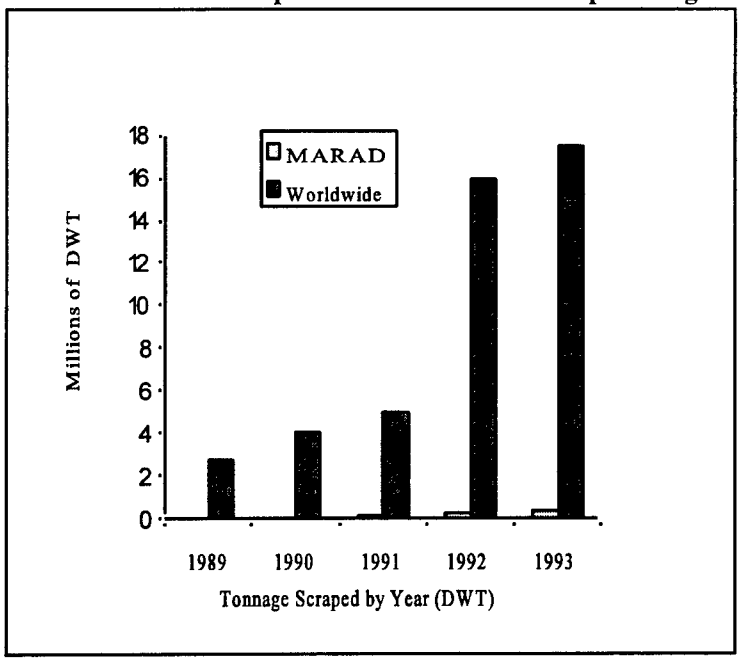
CHAPTER III
ENVIRONMENTAL CONSIDERATIONS

This section discusses the baseline against which potential environmental consequences of implementing the NMHA are assessed in Chapter IV. The range of conditions are bounded and limited by the physical requirements for a typical ship scrapping site. In general, the range of environmental conditions within the United States and foreign countries for the alternatives is limited to coastal regions.

The typical ship scrapping site in the United States is located in urban industrial areas coincident with other industrial and maritime-related facilities. Scrapping sites generally require rail access, although some scrapping is done in areas serviced only by truck, as well as substantial electrical service. Some current ship scrappers also provide automobile shredding facilities at the same site. The facilities are generally small, less than 10 acres, and usually work on one ship at a time. A typical U.S. yard may work on 2-3 ships per year.

The scrapping market is supported by both military and commercial vessels. Theoretically, in order to maintain a 350 ship fleet, and given the average 30-year life of a ship, the U.S. Navy may scrap 10 to 15 ships a year. MARAD has added an average of 10 ships per year to the scrap market; however, existing mandates to reduce the fleet size have inflated this number, and MARAD will be forced to scrap an average of 22 ships a year for the next three years.

Table I - MARAD Scrap Sales vs. Worldwide Scrap Tonnage



Conditions surrounding the affected environment of ship scrapping sites outside of the United States are somewhat similar, although there are differences. One of the most striking differences is the volume of scrapping done at foreign yards. While typical U.S. yards may scrap 2-3 ships per year, a foreign yard may scrap many times that number. In India, for example, there are currently 130 ships being scrapped simultaneously and 15 more waiting offshore.

In the United States, ship scrapping requires only a limited number of laborers, ranging from a few dozen to forty. The labor mix includes low- to moderate-skilled craft labor (welders, crane operators) along with unskilled labor (forklift operators, sweepers, loaders). For the most part, domestic scrapping will not attract substantial numbers of new laborers to a region. Given the market potential, the logistic requirements for proximate ship channels and infrastructure, zoning requirements, and extensive environmental requirements, it

is unlikely that new ship scrapping facilities will be constructed in pristine coastal regions of the United States.

Depending upon the location, foreign ship scrapping may use more raw labor and fewer technologically advanced techniques than in the United States. The labor force is larger and less skilled. Moreover, the methods used for metal removal rely more upon manual labor than similar activities in the United States. Scrapping facilities in the major countries engaged in scrapping are well established. As in the U.S., it is unlikely that new facilities would be established in pristine areas.

REQUIRED PERMITS, LICENSES, AND AUTHORIZATIONS

MARAD has obtained U.S. Environmental Protection Agency (EPA) approval under the Toxic Substances Control Act (TSCA) for the disposal of any ship, whether for foreign or domestic scrapping, an issue thoroughly discussed in Appendices A, B, D and E. EPA regulates the disposal of PCBs in concentrations of 50 parts per million (ppm) or greater. EPA's TSCA regulations authorize the import or export for disposal of PCBs only at concentrations less than 50 ppm. While there are no EPA regulations specific to ship scrapping, EPA's regulations have been interpreted in its November 30, 1995 guidance letter to apply to ship scrapping because ships are presumed to contain PCBs in concentrations of at least 50 ppm in electrical cables, gaskets, thermal insulation, electrical equipment, motor oil, and elsewhere.

In the United States, scrapping operations would be subject to the full panoply of applicable environmental laws for the generation, treatment, transportation, and disposal of hazardous waste. Because state laws differ from location to location, the extent to and manner in which scrapping activities are regulated depends upon the state in which scrapping takes place.

Ship breaking/recycling generates workplace air contaminants that are regulated in the U.S. by the Occupational Safety and Health Administration under the Occupational Safety and Health Act (OSHA) and air pollutants that are regulated by EPA under the Clean Air Act (CAA). Depending upon the geographic region and air quality attainment status, preconstruction and operating permits under the Clean Air Act might be required of a ship breaking/recycling facility. Additionally, a ship breaking/recycling facility could be subject to Clean Air Act new source performance standards.

Ship breaking/recycling facilities routinely handle process water, harbor water, and rainwater that accumulate in the bilges of ships. This water may contain oily residues, metals, chemicals used in ship cutting, and other shipboard contaminants, the disposal of which may be regulated. The discharge of any of these waste waters into either the waters of the United States or publicly owned treatment works (POTWs) is regulated under the Clean Water Act.

Aside from bilge water and other waste water, rainwater runoff from a ship breaking/ recycling facility may require permits (e.g., National Pollutant Discharge Elimination System (NPDES) permits). In the United States, scrap yards and salvage yards must obtain a storm water runoff

permit regardless of whether the storm water has come into contact with any equipment or material (Appendix A, B).

In the case of foreign scrapping, EPA has required that MARAD remove in the U.S. all PCBs, with the exception of applied oil-based paint, and bulk hazardous materials that are not a part of the ship's structure. Accordingly, the removal, handling, and disposal of such wastes would be governed by U.S. laws and regulations as discussed above. The environmental laws and regulations of the importing country would govern the scrapping operation for the remaining hulk.

The countries to which a vessel may be exported are limited in the IFB to those that are Parties to the Basel Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal (Basel Convention). Although the U.S. is not a party to the Basel Convention, it has signed the Convention and intends to act consistent with the spirit and intent of that Convention. The Basel Convention, which entered into force on May 5, 1992, requires Parties to ensure the availability of adequate facilities for the environmentally sound management of hazardous wastes and other wastes; to ensure that persons involved in the management of such wastes within the country take the necessary steps to prevent pollution arising from the management of such wastes; to prevent the import of such wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner; and to minimize the consequences for human health and the environment if pollution from such wastes occurs.

DISCUSSION OF ENVIRONMENTAL RESOURCES

Various resources have the potential to be impacted by the alternatives considered in this EA. This section discusses the particular resources that may be affected and the issues of concern that will be evaluated in determining if a given alternative will have a significant impact.

Air Quality:

Air quality, as addressed in this section, refers to the quality of air in the localized area near the affected sites. It does not include indoor air quality and air quality in the workplace, as such.

Air pollution can have a variety of adverse effects. The issues and concerns include the following:

- Human health effects. The primary issue and concern pertaining to air quality is the effect of polluted air on human health.

- Vegetation effects. Ground-level ozone, sulfur dioxide, nitrogen oxides, hydrochloric acid, and fluorides are responsible for crop losses and can cause damage to trees and landscaping plants.

- Reduction in visibility. Visibility may be reduced from emissions in urban areas and from long-range transport of small particles, such as sulfates formed by the release of sulfur oxides.

Local air quality conditions are generally related to population density, manufacturing activities, topography, and area meteorology. The air quality at a given location can vary greatly with atmospheric conditions, depending upon the atmospheric stability and the mixing depth of the atmosphere. In general, the more stable the atmosphere and the lower the mixing depth, the poorer the air quality. Local air quality in coastal regions is heavily influenced by prevailing offshore winds.

Water Quality:

Because of the necessity that all of the alternatives take place in or near a marine environment, standing and running freshwater systems are unlikely to be directly affected. The surface area through which the water flows downward into the water table aquifer is the recharge area. Activities in the recharge area, such as pollutant discharges, can have an immediate effect on water quality in the water table aquifer (Johnston, 1988). There is a remote possibility that lacustrine or riverine systems could be affected if contamination of a water table aquifer occurred as a result of scrapping activities and that contamination was transported by the aquifer to a body of water. This, however, is unlikely.

It is more likely that the alternatives would affect surface water in estuarine areas and groundwater. The groundwater where scrapping occurs may or may not be potable. The surface water would not be potable, but would support marine life. The estuarine surface water also supports many other uses (e.g., recreation, subsistence, tourism, mariculture, fishing, and industry). The open ocean areas -- areas beyond the continental margin -- could also potentially be affected by discharges from towing and towed vessels.

The issues and concerns related to water quality include:

- Spills of chemicals, sludges and other wastes, either into surrounding water or onto adjacent ground. If ground based spills are not remediated, contaminants may move into surficial or even deep aquifers. Even if the contamination is not sufficient to render the water unpotable, chronic exposure to low levels of some contaminants is sufficient to influence health problems. Spills into surrounding waters produce impacts more quickly, as contaminants are translocated from the source by tidal currents. Floating booms may reduce impacts from buoyant materials, however, soluble compounds are more easily transported.

- Discharge of untreated process water from ship scrapping directly into POTWs, sewers or storm sewers may affect the efficient operation of treatment facilities.

- Discharges from towing vessels and towed vessels.

Noise:

Noise is sound that interferes or interacts negatively with the human or natural environment. For acoustic measurements of effects on humans, sound levels are denoted as dBA. The smallest change in noise levels detectable by the human ear is approximately 3 decibels (dBA). An increase of 10 dBA is roughly equivalent to a doubling in the perceived sound level. Table II shows typical noise levels of familiar noise sources and public responses.

Table II - Public Response to Noise Levels

Noise Source	dBA	Public Response
	> 120	Discomfort to pain
Jet takeoff	120	
Inside boiler room	85 to 90	Hearing damage criteria triggered
Acceptable for residential land use	60 to 65	
Inside department store	50 to 55	Goal for urban areas
Inside home	30 to 40	Community annoyance
Inside recording studio	20 to 25	

The propagation of sound is affected by various factors including meteorology, topography, and barriers. Under free-field conditions, where there are no reflecting surfaces other than the ground and a loss-free atmosphere, sound decreases at a rate of 6 dBA for each doubling of distance (Harris, 1979). The effects of noise are related to the magnitude of the sound, the time of day, and the duration of the sound. Noise from ship scrapping can affect both humans and wildlife in the immediate vicinity of the scrapping operation.

The impact of any potential source of noise would depend upon the magnitude of the noise, the sensitivity of surrounding areas to noise, and noise-attenuating factors such as topography, meteorology, and barriers, such as vegetation. Acoustic conditions will vary with the type of land use, population, density, types of noise sources, and other factors.

The levels typical of residential land uses range from about 35 dBA for a rural residential area to 72 dBA or higher for an urban area. Higher noise levels can be expected to occur in more industrialized areas.

Issues and concerns include the following:

- Community Exposure. The consequences of noise levels on people outside the workplace include physiological effects (e.g., hearing loss), behavioral effects (e.g., interference with speech, sleep, and performance), and subjective effects (e.g., annoyance).

- Worker Exposure. Effects of noise levels on people in the workplace (workers exposed to high noise levels as a part of their job duties) include hearing loss and interference with activities. Noise in the workplace may also be a safety concern.

- Wildlife Exposure. Noise levels have both physiological and behavioral effects on wildlife.

- Domestic Animal Exposure. Noise levels also have physiological and behavioral effects on domestic animals.

Hazardous and Toxic Materials:

The terms *hazardous waste* and *hazardous substances* have special meaning under the Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), respectively. The term *hazardous and toxic materials* is used here although it has no special, statutory meaning. For purposes of this EA, the term includes all substances that pose a risk of harm to human health or the environment if released into the air, surface water, ground water, or soil. It includes hazardous waste and hazardous substances.

Hazardous and toxic materials are found throughout older ships. PCBs are of particular concern and are likely to be found in some form in many of the ships subject to MARAD's scrapping program (see Appendix D). Regulated PCBs in concentrations above 50 ppm have been found in door and hatch gaskets, grout, caulking, rubber isolation mounts, thermal insulation, and duct tape (Appendix D). Other hazardous materials are also present on some vessels. Asbestos is in pipe lagging, adhesives, tiles, gaskets, valve packing, electric cable covering, heat shields, putty, acoustic and thermal insulation, and pipe hangers. Lead is in ballast, cable coverings, gaskets, and plumbing joints. Red lead tetroxide and tributyl tin are in marine paint. Lead chromate and chromic oxide are also in paint. Used oil contains benzene and polynuclear aromatic hydrocarbons, and may contain lead, cadmium, chromium, arsenic, and xylene. Discarded paint may contain formaldehyde, toluene, methyl ethyl ketone, trichloroethylene, and methylene chloride. Mercury, freon, and ethylene glycol are found in equipment. These hazardous materials -- virtually all of which will become hazardous waste under RCRA -- are generally removed and transported off-site for disposal.

Processes and materials used in ship scrapping use and produce hazardous and toxic materials. Ozone is produced by electric sparks. Carbon monoxide is produced by combustion. Solvents, such as acetone, are used for surface preparation and release moderately toxic fumes at ambient temperatures. Cadmium, toxic in its metallic form, releases a poisonous vapor when it is heated by cutting torches to greater than 321 °C. Chlorine-containing organic materials, such as PCBs, release dioxin and furan fumes when heated. Mineral grits used in blasting quickly become dust and through adsorption can take on hazardous and toxic characteristics.

Issues and concerns related to hazardous and toxic materials are closely connected to other topics covered in this EA. For example, releases of hazardous materials and waste to the air and surface water are covered in the sections that address those media. Critical issues addressed here include:

- Risks associated with the handling and removal of hazardous materials or wastes including releases of hazardous materials and wastes to the surrounding environment and exposure to humans.

- Risks associated with the disposal of hazardous and toxic materials.

Visual Resources:

Visual resources are the definable appearance of a landscape unit as described by elements such as landform, vegetation, water, and man-made features. They are those man-made or natural features that can be seen. The elements that make up a landscape unit are described in terms of their visual quality within a physiographic region. The value and importance of these elements are described relative to the region.

Visual resource quality is influenced by the relative size of an object, particularly its height, the dissimilarity to its surroundings, including shape and color, and the quantity and frequency of viewers. Finally, it is important to consider the type of users, the amount of use, public interest, and viewer expectations. These factors determine the sensitivity of a landscape to change.

Specific issues and concerns related to the impact on visual resources include:

- Changes to the environment that diminish or destroy the quality of visual resources.

- Introduction of man-made structures, such as those common to ship breaking, into a rural or undisturbed site as opposed to an existing industrial area.

Analysis of the impacts on visual resources must take into account existing use patterns as well as regional and cultural differences in viewer expectations, visibility, and user activities.

Biological Resources and Wetlands:

Biological resources are the flora and fauna in terrestrial and aquatic ecosystems that could be affected by any of the alternatives. Scrapping will take place in and near coastal and estuarine areas and, to some extent, the open ocean. Consequently, although some terrestrial species will be affected, the most affected species will be those comprising estuarine, coastal, and marine ecosystems, and those species that rely on those ecosystems for habitat.

Issues and concerns pertaining to biological resources include the following:

- Loss or Degradation of Habitat. Loss, alteration, or degradation of terrestrial or aquatic habitat can occur through pollution, human intrusion, or even facially benign alterations that change the optimal physical or chemical habitat parameter needed by a particular species. Habitat loss, alteration, or destruction can result in loss of nesting areas, spawning or breeding areas, and feeding areas.

- Loss of Wetlands. Loss of wetlands can result in adverse impacts to surface and groundwater quality and quantity, increased shoreline erosion, increased flooding, decreased habitat quality for fish and other aquatic biota, and loss of specialized habitat required by threatened and endangered species, as well as more numerous waterfowl, mammal, songbird, amphibian, and reptile species. Like other surface waters, wetlands are subject to the same types of issues and concerns discussed for water quality.

- Threatened and Endangered Species. Reduction in the populations of threatened or endangered species or destruction of critical habitat could contribute to their eventual extirpation from localized regions or their ultimate extinction, reducing regional and global biodiversity.

Socioeconomics:

The social, economic, and demographic variables associated with community growth and development may be affected by the alternatives. Social consequences (e.g., adverse health effects from poor air quality conditions) may affect the overall quality of life enjoyed by the residents of a community.

Similarly, demographic consequences (e.g., out-migration of firms and labor because of increased business costs) can affect the size, distribution, and composition of community population.

Inextricably connected with the community's ability to respond to changing conditions is whether some segments of the community would bear a disproportionate amount of environmental burdens caused by the change.

The primary focus is the relationship between the factors of production (defined as labor, broadly as the resources needed to produce a certain good or service) and a community's ability to accommodate or absorb these demands. Specifically, the following issues and concerns arise.

- Whether the proposed activity would impact on labor, capital, businesses, land, or community resources such as schools.

- Whether there would be an impact on the domestic or international metals markets.

- Whether there would be environmental burdens and whether those burdens would be equitably borne.

Geology and Soils:

Soil is the loose surface material of the earth, usually consisting of disintegrated rock, organic matter, and soluble salts.

Issues and concerns involving soils include the following:

- Disturbance of Soil Formation and Transportation Process. Soil is created by the weathering of rock and the mixing of weathered rock with organic material. Soil is transported by gravity alone -- in the case of mass movement -- and by wind, rain, and ice. This transportation is referred to as erosion. Alteration of these processes could affect the type and quantity of soil available (Smith, 1981).

- Soil Contamination. Spills or leaks of hazardous materials could irreversibly contaminate soils through adhesion to soil particles. Contaminated soils could require excavation and disposal and could contribute to contamination of the groundwater.

Cultural Resources:

Cultural resources include sites, structures, districts, and objects that contribute to the understanding of the history and culture of a community or country. Consideration of impacts to cultural resources would encompass any areas where ship scrapping, ship cutting, or ship maintenance takes place, the areas where the ships in the reserve fleet are now anchored, and the ships themselves.

Issues and concerns pertaining to cultural resources include:

- Destruction of Artifacts and Fossils. Artifacts of earlier civilizations and fossils of scientific interest may be destroyed through activities undertaken in furtherance of an alternative.

- Compromise of Historic Site. Activities could compromise the integrity of a site of cultural, historical, or scientific significance.

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CHAPTER IV
ALTERNATIVES AND POTENTIAL ENVIRONMENTAL IMPACTS

Chapter IV provides a description of each alternative and assesses the potential environmental impacts of the alternatives. The discussion of the environmental consequences for each topic is followed, where appropriate, by a discussion of mitigation measures, which might prevent or diminish negative impacts.

The discussion of impacts includes all ship cutting and related activities that take place within the scrapping facility and transportation of hazardous waste off-site. The analysis of the potential environmental consequences is based in part on the results of a ship sampling and analysis program completed in November 1995 by MARAD. This program, described in Appendix D, does not provide the basis for predicting accurately the precise amounts of potentially hazardous and toxic substances that were used in building vessels in the NDRF or that will be encountered in scrapping a particular ship; however, it does provide insight into the variation in PCB content in those ships subject to disposal under section 6(c) of the NMHA.

ALTERNATIVE 1 - SALE FOR DOMESTIC SCRAPPING

Under this alternative, MARAD would sell the ships for scrapping entirely or partly in the U.S. Ordinarily, the fleet superintendents recommend which ships should be sold for scrap based upon age, condition, usefulness for parts, and accessibility. These recommendations are reviewed within MARAD and the Department of Defense. Once MARAD makes the final decision on which ships will be sold, it publishes an IFB, receives and publicly opens the bids, evaluates the bids for responsiveness to the invitation, adequacy of the technical compliance plan and suitability of price, and awards a contract for the sale of the vessels based on such evaluation.

The purchaser usually contracts with a private firm to remove the ship from the fleet and to prepare it for tow. In accordance with MARAD's Action Plan, before a ship is removed from the fleet, MARAD employees must perform an inspection to ensure that there are no hazardous materials on board that are not inherent to the structure of the ship. Once a ship has passed the hazardous materials inspection, a MARAD employee frees the ship from its moorings and it may be removed by the purchaser.

Before the tow, the master of the towing vessel must coordinate with the U.S. Coast Guard Captain of the Port for the departure port, destination port, and each transit port to establish the requirements necessary to ensure the safety of both the tow and the ports. (33 CFR §§ 6.04-.08 and part 160). All of these requirements must be contained in a towing plan. Typical towing plans include oil spill countermeasures, safeguards for the vessel being towed, and any requirements peculiar to the vessel and its contents. Specific geographic locations may require additional measures in the plan. Appendix B details the procedures involved in relocation of the vessel.

At the conclusion of the tow, fuel oil and lubricants would be removed from the ship. In the United States, if more than 250 gallons of fuel oil or lubricating oil will be removed, the Captain of the Port must be notified and Coast Guard approval obtained. Also, the port must certify that there are adequate oil transfer facilities available. The receiving facility must have oil spill cleanup and notification procedures, periodic inspections, and training. The transportation of used oil from a ship is subject to DOT requirements concerning equipment, contingency plans, training, and record keeping. Compliance with these requirements is the responsibility of the transporter (see Appendix B).

The vessel would be scrapped at pier side or in a drydock as described in Chapter II. Metals recovered from the vessel would be recycled and hazardous and other wastes would be disposed of in accordance with EPA regulations. Generators and transporters of hazardous and other wastes from the ships must employ management practices and procedures that comply with standards established by EPA, including those designed to ensure the effective operation of the manifest system, which tracks hazardous waste from generator to transporter to treatment, storage or disposal (TSD) facilities.

Once a ship has been completely dismantled, the ship breaker/purchaser must provide documentation to MARAD, as required in the contract of sale, that the ship was disposed of properly, that it was dismantled within 24 months of purchase, and that no parts were sold to restricted countries. This "affidavit of compliance" must be duly attested to and in the case of foreign scrapping must be authenticated by a U.S. Consul in the country in which the ship was scrapped.

The potential environmental impacts stemming from this alternative are presented below.

Air Quality:

There would be NO_x and SO_2 emissions from the tugboat towing the vessel to the scrapping facility. Depending on the manner in which the tug was refueled, there could be hydrocarbon emissions as well. These impacts would be similar to those associated with normal domestic shipping operations and are considered nominal.

There could be some emissions from preparing the surfaces prior to cutting. Hydrocarbon emissions from the most commonly used solvents would not be of sufficient magnitude to have appreciable ambient air quality impacts, however, as very little solvent is employed. In addition, use of mineral grit as a blasting medium would generate particulates. Much of the particulate matter generated from blasting would be larger than 10 microns and, thus, not regulated as PM_{10}. That portion that is regulated as PM_{10} is not likely to cause major air quality impacts.

Most of the emissions would be caused by ship cutting. Torch cutting releases metal fumes and some or all of the following materials as particulates: asbestos, lead, manganese, nickel, chromium, iron, and aluminum. Fibrous glass particulates could also be emitted. As particulates, these pollutants are not likely to have a major air quality impact. To the extent

that these pollutants are hazardous, they could have a somewhat greater impact if there are residents living close to the point of release, particularly if there were a low inversion layer and very little wind. However, as most ship scrapping facilities generally are not located in residential areas, the impacts are expected to be insignificant.

Related facilities could also cause emissions of air pollutants. Shore side power plants would cause NO_x and SO_2 emissions, and petroleum storage facilities would cause hydrocarbon emissions, but these would not be new sources.

Any impacts to vegetation would likely be localized and minor given the industrial nature of the sites where vessels are scrapped. Impacts to visibility, if any, would be of short duration and localized.

Use of new technology may reduce air emissions from ship cutting. The employment of FireJet® torches, lasers, water-jets, explosives, and shears may produce fewer emissions from ship cutting than conventional torches (Appendix C). To the extent that cold cutting -- e.g. water jet cutting -- is used, fumes from heated metals would be reduced or even eliminated. Use of vapor recovery systems and floating roof tanks would reduce the level of hydrocarbon emissions from petroleum storage facilities. Adherence to New Source Performance Standards (NSPS) and CAA permit conditions would also reduce emissions.

Water Quality:

Absent the use of underground storage tanks, which is very unlikely, or underground injection of wastes, which is even less likely, there is only a slight risk of any effects upon groundwater from scrapping ships domestically. The principal impact would be from accidental discharges of wastes into an aquifer recharge area. These wastes could percolate to a water table aquifer or -- although less likely -- to an artesian aquifer.

There is potential for impacts to local groundwater supplies should a ship scrapping site require large volumes of fresh water for a particular process, although this is unlikely under current operating conditions.

The principal impact to surface water would be from storm water runoff and indirect discharges through Publicly Owned Treatment Works (POTWs). Ship scrapping facilities routinely handle process water and harbor water, as well as the rainwater that accumulates in the bilges of ships. This waste water may contain oily residues, metals, chemicals used in ship cutting, and other shipboard contaminants. Although treated as contaminated process water and subjected to regulated pretreatment, this waste water may also be discharged inadvertently into surface water.

Used oil that is sent without pretreatment to a POTW can affect POTW performance by reducing the efficiency of the biological oxidation process. Lead compounds, such as red lead (Pb_3O_4), have been used extensively in marine paint. Although, typically, these compounds are

not highly soluble, their effect is cumulative. Paint removed during surface preparation and not contained by engineering controls, could result in lead and other compounds being discharged into nearby surface water.

In practice, the risk of surface water pollution is reduced through the requirement for storm water runoff permits, and the use of storm water management plans and Spill Prevention Control and Countermeasure (SPCC) plans, which include best management practices for handling hazardous liquids. Storm water management plans specify practices to contain and treat storm water runoff from impervious surfaces, such as paved work areas, parking lots, and structures. These measures may include oil-water separators, pretreatment of process water prior to discharge to POTWs, and shore and water based booms to contain and absorb oily runoff. SPCC plans specify practices to prevent the leakage or spillage of liquids that could contaminate surface water or groundwater and measures to contain and clean up liquids that do spill.

Discharges from the towing vessel and runoff from the vessel being towed are the most likely source of contaminants in the open ocean. These routine towing operations are governed by oil pollution and ocean dumping laws. The potential impact to ocean waters would be negligible.

Noise:

Both grit blasting and cutting could generate noise levels from 90 to 130 dBA, measured at approximately 10 feet. There is roughly a 6 dBA decrease for every doubling of distance, assuming there are no barriers present, which would further reduce the noise.

Noise levels between 50 and 60 dBA are normally acceptable for most residential areas. Levels as high as 70 dBA would normally be tolerated in most public and commercial areas. Levels up to 75 dBA are generally tolerated in industrial areas. At night, 10 dBA less would be tolerated in public, commercial, and industrial areas and 15 dBA less would be tolerated in residential areas.

If the actual location of the ship cutting were within 5 miles of a residential area, the residents could be disturbed by the noise levels during the day. In the unlikely event that ship cutting were to take place at night, residents 10 miles away could be disturbed. These values are extraordinarily conservative. They assume no sound diminution from man made or natural barriers. Depending on the extent to which there are such barriers, the distances at which residents would be bothered by the noise could be reduced by as much as 50 percent. These impacts could be further mitigated by limiting work to daytime hours.

Wildlife, waterfowl, and domestic animals may be affected by noise at the ship scrapping site through startle effects and nesting avoidance. It is likely that such impacts have already been realized at potential ship scrapping sites and that impacts from scrapping NDRF vessels would be nominal, as the scrapping sites would likely be located in previously industrialized areas and scrapping activities would be consistent with existing use patterns.

Hazardous and Toxic Materials:

In the process of scrapping a ship, many hazardous and toxic materials would be removed or generated. To the extent that they constitute waste, most of them would be regulated as hazardous wastes under RCRA. PCBs would be regulated under TSCA. Hazards in the workplace would be regulated under the Occupational Safety and Health Act. The impacts associated with these hazardous and toxic materials can best be mitigated through adherence to regulatory standards and requirements imposed pursuant to these Federal laws and applicable state laws.

Transportation of hazardous and toxic wastes from the ship scrapping site to a RCRA permitted facility would be under the control of an EPA licensed contractor, and subject to a separate health and safety plan, as well as an emergency response plan. Storage, treatment (if any) and disposal of wastes at the facility would be conducted by a licensed contractor. Impacts from normal operations for the transportation, storage, treatment and disposal of hazardous and toxic wastes generated from ship breaking would be minimal.

Visual Resources:

Little or no impact would result from ships being scrapped at existing facilities as these sites are generally located in industrialized areas with ongoing operations. Ship scrapping would be consistent with existing use patterns. In the unlikely event of ships being scrapped at a newly constructed facility, there could be a moderate impact, depending on the current use of the site.

Biological Resources and Wetlands:

The impacts of this alternative will depend largely on the type of pollutants discharged and their proximity to estuaries and wetlands, prime fishery production areas. Estuaries have a hydrodynamic trapping capacity which may lead to accumulations of toxins in sediments and organisms.

Inadvertent discharges of used oil could have immediate impacts on wildlife, waterfowl and marine communities. Of particular concern are bivalves, such as oysters and mussels. Bivalves, and other benthic organisms, are relatively immobile, and toxins tend to accumulate in these organisms.

The application of engineering controls, such as pretreatment of waste water, the utilization of measures included in storm water management and SPCC plans, and the use of oil sorbents and barriers, should reduce the potential for major impacts to surrounding biological resources. In addition, utilization of the Federal Consistency Review provisions of the Coastal Zone Management Act of 1972, 16 U.S.C. §§ 1451-1464, will ensure that states review potential impacts to barrier beaches, salt marshes, and other important coastal and wetland resources and that impacts are minimized.

There may also be impacts to organisms that have become associated with the ship as a supportive structure (e.g., bivalves, birds, bats). When the ships are relocated and ultimately scrapped, the habitat of these organisms will be destroyed. With the exception of organisms that have special status (e.g., endangered species), the impacts are considered minor.

The only known endangered species which may be affected at a fleet site are a pair of nesting peregrine falcons. The falcons are nesting on the MARINE FIDDLER, an NDRF vessel in the James River fleet. There are no plans to scrap the MARINE FIDDLER and steps have been taken to mitigate any possible disruption to the falcons. Ladders leading to the falcons' nest have been cut down, and maintenance on the ships has been limited, to the extent possible, to periods outside of the falcons' mating season. Potential and temporary disruptions of the falcons' habitat could result from the movement of vessels adjacent to the MARINE FIDDLER that are removed from the fleet for scrapping or from the movement of the MARINE FIDDLER itself. As vessels are removed from the fleet for scrapping, some repositioning is necessary to guarantee the integrity of the fleet. However, these impacts may be mitigated by replacing vessels adjacent to the MARINE FIDDLER with other vessels, as was authorized when the CRACKER STATE was scrapped, and by requiring that vessels adjacent to the MARINE FIDDLER be moved only during non-breeding periods.

Due to the placement of typical long established ship breaking facilities, no impacts to threatened or endangered species are expected at the breaking sites.

Socioeconomic Impacts:

Economic consequences to ship breaking workers or other regional workers from actions associated with the proposed action or alternatives are unlikely to be of sufficient magnitude (when compared to the regional economic characteristics) to have major effects on business activities, market structures, procurement methods, and dissemination of goods within and between communities. The typical ship scrapping facility will employ only modest numbers of low to moderately skilled workers at each site. It is unlikely that the new work would generate major impacts on the available employment pool. Similarly, there should be no major impacts on housing, schools, public utilities, transportation, and public support services. However, as these ships will be sold to bidders, should one ship scrapper (or two or more in a single region) acquire the majority of ships for scrapping, the economic consequences are likely to increase in magnitude. Revenue from assessments and real estate and income taxes could provide some benefits.

The amount of material from scrapped ships is small compared to the world market (Appendix F). It is unlikely that this alternative would have any impact on world prices of iron, copper, or other specialty metals.

Sales of ships would provide revenue, to be distributed to the VORF, and other agencies, as required by the NMHA. Positive impacts resulting from this action include the purchase of other RRF vessels, the historic preservation of maritime structures, and the availability of funds to train qualified merchant mariners.

Geology and Soils:

This alternative would have only negligible to slight impacts. Some contamination of surficial soils is likely due to inadvertent spills or lapses in permitted practices. Some subsurface soil would be disturbed for construction of infrastructure support, such as sewer lines, water lines, steam pipes, storm water conveyances, etc.

Cultural Resources:

Unless a ship being scrapped were to be a cultural resource or to have historical significance, the impacts from this alternative would be none to slight. Impacts resulting from the loss of a vessel with special significance may be mitigated by the donation of that vessel or another vessel for historic preservation or the donation of vessel parts that have special significance or that may be used to maintain other historic vessels. For example, Project Liberty Ship, a group that operates one of the last remaining liberty ships, would like to salvage the propeller and other equipment from the PROTECTOR, an NDRF vessel that would be scrapped, to be used on the JOHN BROWN, a liberty ship currently being maintained as a museum. The Navy would also like to use the engines from the PROTECTOR as a teaching aid in courses providing instruction on the development and operation of steam engines.

In the unlikely scenario that a greenfields site were to be chosen for the construction of a new ship scrapping site, cultural resources could be impacted. Consultation with the appropriate State Historic Preservation Officer and the Advisory Council on Historic Preservation would determine if cultural resources could be affected and allow for consideration of possible mitigation.

Positive impacts to cultural resources would result from the transfer of a percentage of the funds obtained from a sale for scrapping to the Maritime Heritage Grants Program. Under this program, grants are provided to maintain and restore cultural maritime resources (e.g., lighthouses, lightships etc.).

ALTERNATIVE 2 - SALE FOR SCRAPPING IN FOREIGN COUNTRIES

In this alternative, ships would be selected, sold, and moved from current NDRF berths, as with the domestic scrapping alternative. Hazardous materials that are not part of the ship's structure would be removed in accordance with MARAD's Action Plan before the vessel is made available to the purchaser. The purchaser would then take the ship to the location of its choice in the United States for PCB removal/testing in compliance with the November 30, 1995 EPA Enforcement Letter.

EPA's TSCA regulations, 40 CFR §§ 761.20(b) and 761.60(h), authorize the import or export for disposal of PCBs only at concentrations less than 50 ppm. EPA presumes that the following items on ships being scrapped contain PCBs in concentrations of at least 50 ppm: electrical cable; rubber gaskets; felt gaskets; thermal insulation material; transformers; capacitors; electronic equipment with capacitors and transformers inside; voltage regulators;

switches; reclosers; bushings; electromagnets; adhesives; tapes; oil (electrical equipment and motors, anchor windlasses, hydraulic systems, leaks and spills); certain machinery and other solid surfaces; oil-based paint; caulking; rubber isolation mounts; foundation mounts; pipe hangers; light ballasts; and any plasticizers. In order to export a vessel, the purchaser and MARAD must comply with the November 30, 1995 EPA Enforcement Letter, including the following terms and conditions.

- MARAD and the ship scrapper/PCB remover would be considered co-generators of any PCB waste resulting from ship scrapping operations.

- MARAD would be required to provide financial assurance that EPA could rely upon in the event that the purchaser or scrapper is unwilling or unable to remove and properly dispose of PCB waste from the ships. EPA has determined that the $75,000 performance bond from the purchaser combined with MARAD's self-insurance and status as a co-generator are sufficient to meet this requirement.

- All PCBs in concentrations of 50 ppm or greater, with the exception of dried oil-based paint, must be removed and disposed of in accordance with 40 C.F.R. § 761 prior to export of the ships for scrapping. EPA provided a list of items that it presumes contain PCBs in regulated quantities with the direction that these items could, at the election of the purchaser, either be removed, or left on the ship if by sampling and analysis the purchaser could rebut the presumption that the items contained PCBs in quantities of 50 ppm or greater. EPA provided sampling guidance for the purchaser.

- Following removal and testing, the PCB remover/scrapper must provide a certification from its President or CEO that successful removal and proper disposal of all regulated PCBs and PCB items from the ships have occurred. MARAD must conduct a final audit inspection to ensure that all regulated PCBs have been removed and provide a copy of the written audit report to the EPA regional office where the removal took place.

- If oil-based paint has not been removed or exempted by testing, the EPA will notify the importing country that the paint on the ships may contain PCBs in concentrations of 50 ppm or greater. This notice will also recognize that the vessels may contain asbestos and lead, and the importing country will be given 90 days to object to the export of the ships.

Large commercial hulls and some military hulls have historically been exported overseas for scrapping, as the prices offered by foreign commercial concerns for the vessels tend to be much higher than in this country. Metals recovered from the vessels are used as a source of raw materials in the developing industries of the scrapping countries, because manufacturing of new raw steel in old, inefficient steel production plants uses as much as twice the energy of a

modern plant to produce a ton of steel (see Table III) and creates environmental problems of its own.

In the past, little preparation of vessels took place in the United States prior to towing the vessel overseas. That practice is changing, as discussed above, because of the likely presence of PCBs throughout the ships to be scrapped.

India, China and Mexico have been the major locations for MARAD ships sold for scrapping since 1989, with India receiving the largest number of ships. This trend is expected to continue.

In India, most ships are broken in Alang, where the government owns a long strip of beach and leases ship breaking/recycling lots to scrapping companies. At high tide, the ship is driven as close to the beach as the ship's draft will allow. Workers dismantle the ship using acetylene torches, hand tools, and cranes. The workers begin at the top deck of the ship and work down to the hull.

Table III - Comparison of Energy Requirements for the Production of Steel from Ore

Country	Average Gigacalories Required per Ton of Steel Produced
Japan	4.01
Germany	5.20
Korea (Pohang plant)	5.21
United States	6.00
India (Bhilai plant)	8.90
India (Bokaro plant)	10.81
India (Pourkela plant)	11.12
India (Durgaphur plant)	11.45

* Source: World Resources Inst., 1994.

In China, ships are scrapped in locations along the east coast, generally between the cities of Beijing, Shanghai, and Guangzhou. There are over 150 scrapping sites in China. All scrapping companies are owned by the government. The method used for breaking a ship varies depending upon location and the size of the ship. Ships may be scrapped by driving them onto the beach, tying them alongside a pier, or placing them in a dry dock. Most MARAD ships are small enough to be scrapped alongside a pier.

In Mexico, ships are broken in Tuxpan, where more sophisticated methods of breaking ships are used than, for example, in Alang, India. At Tuxpan, vessels are directed into a man-made canal parallel to the Tuxpan River. This canal has been specifically created to service the scrapping operation. The ships are dismantled mechanically, one at a time, using cranes while the vessels remain floating in the canal. Large pieces of the vessels are transferred to a work yard abutting the canal, where they are manually broken into smaller units and loaded onto trucks for transport to a nearby mill.

PCBs and hazardous materials that are not a part of the ship's structure will be removed in the U.S.; however, the laws and regulations of the importing country will govern the breaking operation for the remaining hulk. Although the laws of each country will vary, there should be appropriate measures in place to ensure that hazardous materials are properly handled because the countries to which NDRF vessels are expected to be exported are Parties to the Basel Convention. As discussed earlier, Parties to the Basel Convention are required to ensure that adequate facilities are available for the environmentally sound management of hazardous wastes and other wastes; to ensure that persons involved in the management of such wastes within the country take the necessary steps to prevent pollution arising from the management of such wastes; to prevent the import of such wastes if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner; and, to minimize the consequences for human health and the environment if pollution from such wastes occurs. Accordingly, the laws and regulations of the importing county should mitigate potential environmental impacts in a similar fashion to U.S. laws and regulations.

The following environmental impacts could potentially occur under this alternative.

Air Quality:

Generally ambient air quality data is not available for the immediate scrapping areas because air monitoring done on a worldwide basis usually focuses on urbanized and highly populated areas. The scrapping sites tend to be located in fairly rural areas with low population densities. The coastal regions near the ship scrapping sites would likely meet the guidelines set by the World Health Organization (WHO) for particulate matter, sulfur dioxide, nitrogen dioxide, carbon monoxide and lead. However, the concentrations of these materials would probably be high in the area immediately adjacent to the ship scrapping operations due to equipment used to burn fuel or that runs on fuel and soil disturbances such as dust created by scrapping activities (Appendix G, pp. 4-16, 4-18, 4-21).

In the area of Mexico where ship scrapping would occur, there are hydrocarbon emission and smog problems as well as lead pollution episodes. In the relevant area in China, there are methane emission and SO_2 and NO_x pollution problems. There are also methane, SO_2, and particulate emission problems in the relevant area of India (Hook, 1982; Robinson, 1989; Smith, 1981; Wright, 1994).

Ships sold by MARAD for scrapping generally would be broken in the same manner that ships from other sources are broken. They would represent an additional source of air pollution at ship scrapping sites; but, because they would represent only a small fraction of the ships scrapped at each site, their impact would be relatively minimal. See Table I, *supra* at 7. Moreover, the geographic distribution of the scrapping of MARAD ships should follow historical patterns with which the local habitats have had years to accommodate.

Water Quality:

In general, the scrapping sites are located on rivers or gulfs, which rise and fall with the tides. There is undoubtedly some localized contamination of the water immediately surrounding the scrapping sites. The extent to which the contamination would extend beyond the immediate area would vary depending upon the degree to which the waters mix with the tidal waters. For example, at Alang, India, it is likely that the methods used to break a high volume of ships at the site have caused contamination of waters near the beach. Further, because of the shallow depths offshore from the beach, the plume of contamination probably mixes slowly and extends outward (Appendix G, p. 4-18).

Available data suggests that at the scrapping site at Tuxpan, Mexico, the Tuxpan River and the Gulf of Mexico waters along sand beaches near the confluence of the Tuxpan River do not suffer from significant water pollution, although they are subject to chronic low level discharges from oil and gas exploration and production (Appendix G, p. 4-16).

In China, ship scrapping takes place along the east coast. From Shanghai south to Hong Kong the waters are polluted by sewage, some mining wastes, and runoff. North of Shanghai there is industrial pollution as well (Bullock, 1991; Gross, 1993; Random House, 1991).

Waters around foreign facilities would be subject to the same potential contamination as in U.S. facilities, e.g., falling debris and leaks of oils and fuels as ships are broken. Any hazardous materials that are an integral part of the ships at the time of scrapping could fall into the water and, thus, affect water quality. Paint on debris falling into the water could slowly dissolve in the water. Bird droppings which accumulate on some MARAD ships could be blown or brushed into the surrounding water during the breaking operations, causing localized nutrient enrichment. In beaching operations, when ships are driven into the mud and sand of the beach at high force, sediments become resuspended in the nearshore waters increasing turbidity and allowing contaminants in the sediments to reenter the water column. Laborers trafficking through the shallow water surrounding the beached ships create additional sediment resuspension. Tar and oil have been reported to seep out of ships into the shallow water at the beach as they are broken.

Because obsolete MARAD ships would represent only part of the total scrapping activity at any site and would be broken in the same manner as other ships, water quality near the sites would not be expected to change appreciably during the period in which the MARAD ships were being scrapped. The MARAD ships would represent only a small fraction of the ships being scrapped at a given site and would not introduce a new or significantly increased source of water pollution.

Noise:

The noise generated from grit blasting and cutting ships at foreign facilities would be comparable to that generated under alternative one and would result in similar impacts.

Hazardous and Toxic Materials:

The impacts for this alternative would be between domestic and foreign sites. All hazardous materials that are not a part of the ship's structure would be removed by MARAD in accordance with MARAD's Action Plan before the purchaser receives the vessel at fleetside and would be disposed of in accordance with applicable U.S. laws and regulations. In addition, removal and disposal of all PCBs that are not a part of the ship's structure, with the exception of applied oil-based paint, must take place in the U.S. before the vessel may be exported. The impacts would, therefore, be identical to those in Alternative 1.

After cleaning, the remaining hulk would be available for export. To the extent that hazardous materials remain on board the vessel, the impacts would be similar to those in Alternative 1. The handling and disposal of any hazardous or toxic materials resulting from the breaking of the vessel in a foreign scrap yard would be governed by the laws and regulations of the importing country. While the laws and regulations or methods of handling and disposal may differ from the U.S. and vary from country to country, the importing countries, as Parties to the Basel Convention, are required to ensure that there is a regulatory regime in place that will provide for the safe handling and disposal of hazardous and other wastes. Moreover, at the time of export, the vessels will be the cleanest vessels received by these scrapping facilities and would be only a minor fraction of the vessels being scrapped. Consequently, there should be no appreciable impact from the scrapping of NDRF vessels at these sites.

Visual Resources:

The impacts would be approximately the same as for Alternative 1.

Biological Resources and Wetlands:

The lands near the major scrapping sites range from tropical humid forest to warm desert/semidesert. Generally, the land area in and adjacent to the scrapping sites has been heavily disturbed by the scrapping operations and tends to support only sparse vegetation, if any. Similarly, due to the noise, intense human activity, and lack of appropriate food and shelter, the land has little value as a wildlife habitat.

Aquatic biota living in the waters near the scrapping sites might be subject to water quality changes and to physical injury during the scrapping of ships. In particular, ships designated for beaching could scrape bars and shoals near the shore before becoming grounded for breaking. Benthic biota present in these areas could be subject to physical disturbance, and any aquatic biota in the surrounding waters could be adversely affected by the resulting sedimentation. However, biota at the sites have already experienced these conditions for years and would continue to experience them regardless of any decisions concerning the former MARAD ships.

As is the case with U.S. facilities, lands within the scrapping site are already in a highly disturbed condition as a result of ongoing operations and, therefore, do not provide suitable

habitat for terrestrial wildlife. Scrapping of former MARAD ships would not result in the significant deterioration or loss of any additional vegetation or wildlife habitat.

Socioeconomic Impacts:

The scrapping of NDRF vessels in foreign countries could have a positive impact on local businesses and employment near the scrap site. Methods used to break vessels in foreign countries rely more heavily on manual labor than do U.S. sites and employ more people. However, potential socioeconomic impacts from the scrapping of former MARAD ships must generally be considered in the context of their representing only a small percentage of the vessels being scrapped at the same locations. Consequently, any impacts on regional economies, labor demand, the metals market, etc. would be minimal.

Positive impacts in the U.S. would result from the distribution of sale proceeds that are deposited in VORF and disbursed thereafter to purchase new vessels for the RRF, to foster the historic preservation of maritime structures and to train qualified merchant mariners.

Any impact to wildlife that have become associated with the vessels would be the same as Alternative 1 and is considered nominal.

Geology and Soils:

Some contamination of surficial soils is likely due to inadvertent spills. Some subsurface soil could be disturbed for construction of infrastructure support, such as sewer lines, water lines, steam pipes, or storm water conveyances. The impacts, however, would not be significant as former MARAD vessels will be a negligible percentage of the vessels being scrapped.

Cultural Resources:

Potential impacts to cultural resources from the loss of historically significant vessels and the corresponding mitigation measures would be the same as for alternative one. The positive impacts resulting from the transfer of proceeds to the Maritime Heritage Grants Program would also be realized under this alternative.

If a scrapping site were of cultural or historical significance, there could be negative impacts stemming from the disturbance of artifacts or the occupation of the site by the scrapping operation. However, these impacts are likely to have already been realized and would continue regardless of MARAD's decision.

ALTERNATIVE 3 - NO ACTION

Under the no action alternative, the ships located in the fleet would remain in their current locations and would be maintained indefinitely by MARAD. There is some dehumidification of internal spaces and cathodic protection of the hull; however, there is no exterior maintenance performed on the ships. The quality of paint covering the exterior surfaces of these ships

varies. As they are not routinely repainted, the paint on the ships peels off and the ships tend to rust. As the paint peels, it either collects on the decks of the ships or falls into the water. A certain portion of the peeled paint, which in many cases contains lead, will be washed into the water by rain. Similarly, metallic oxides and other materials from the ships' hulls will slowly leach into the water. It is inevitable that rain, wind, and biological organisms enter enclosed spaces and below the main decks. Stagnant water, wind-borne debris, avian waste, and bird and bat nests are common. On the superstructures of some ships there is evidence of nesting sites for peregrine falcons and ospreys.

The no action alternative assumes the continuation of the current level of maintenance of the NDRF fleet. It assumes a constant dollar maintenance program for each ship, with changes in funding related to inflation and an increase in the number of ships as vessels are transferred from the RRF to the NDRF over time, as well as funding for any necessary emergency responses to unplanned circumstances that threaten the status quo.

Realistically, the costs of keeping the inactive portion of the NDRF afloat would continue to rise due to the increase in required maintenance as vessels continue to deteriorate and additional burdens added by the transfer of vessels from the RRF. Although the no action alternative implies some sort of perpetual care, in reality, the ships are resources that are subject to eventual, immitigable and inexorable degradation. Moreover, long before actually sinking, a ship could be so degraded that it could not be towed.

The following environmental impacts could potentially result from the selection of this alternative.

Air Quality:

The emissions into ambient air from this alternative would be negligible.

Water Quality:

If no action is taken, the ships will continue to age and corrode and ultimately may sink. The pollutants on the exterior of the vessel may leach into the surface water, and it is possible that at least the more mobile, non-degradable pollutants may contaminate an aquifer.

The ships contain PCBs, mercury, ethylene glycol, organotin, asbestos, various petroleum derivatives, and compounds of lead, nickel, and cadmium. Barring a breach of the hull, only materials on the exterior of the ships are likely to enter surface waters. Should a hull breach happen, the heavier pollutants can easily become incorporated into the sediment, and the lighter pollutants, such as petroleum derivatives, may adsorb to particulates and become incorporated into the sediment.

Not all of the heavy metals are immediately toxic. Nonetheless, the heavy metals, e.g., mercury and cadmium, and fat soluble toxins, may reach chronically toxic levels through

biomagnification. The impacts are greater in the immediate area around the ship, and in those areas influenced by downstream flow or tidal excursions.

There would be few direct or indirect impacts on open ocean waters.

Noise:

There would be only negligible impacts from noise associated with routine maintenance.

Hazardous and Toxic Materials:

If no action is taken, the ships will continue to age and corrode. Any hazardous materials found on the exterior of the vessel may be leached into the surface water. Discharges of any hazardous materials from the interior of the ship are not allowed and, therefore, are unlikely. Should the integrity of the hull be breached, accidental releases of hazardous materials could occur.

The ships contain PCBs, mercury, ethylene glycol, organotin, asbestos, various petroleum derivatives, and compounds of lead, nickel, and cadmium. If released into the environment through a hull breach, the heavier pollutants can easily become incorporated into the sediment, and the lighter pollutants, such as petroleum derivatives, may adsorb to particulates and become incorporated into the sediment. The impacts resulting from hazardous material releases is greater in the immediate area around the ship, and in those areas influenced by downstream flow or tidal excursions.

Visual Resources:

The impact of allowing the ships to age and corrode at anchor would have moderate visual impacts. Although the ships are not now in pristine condition, they would have more visual impacts as rusting ships.

Biological Resources and Wetlands:

Because of the location of the reserve fleet, the principal impacts associated with this alternative will necessarily occur in estuaries and nearby wetlands.

Over the longer term, materials released from the exterior of the vessels will settle into the sediment, and augment other existing contamination sources. Benthic organisms may become contaminated and selectively pass the contamination up the food chain. The taking and/or consumption of local finfish and shellfish may be regulated due to increased concerns over concentrations of constituents in edible flesh.

Intertidal grasses and organisms relying on these plants for habitat could be affected should contaminated sediment or particulate material wash into these zones.

Positive impacts may be realized by continuing to provide habitat for numerous organisms, particularly the peregrine falcon. However, these benefits would be of limited duration as the vessels would continue to deteriorate and ultimately would have to be removed from the fleet before sinking.

Socioeconomics:

The continued maintenance of ships in the fleet provides slight positive socioeconomic impacts to the affected regions through salaries and commodity purchase. Funding of this action is likely to require increased federal funding due to the increased maintenance requirements of an aging fleet. Negative impacts would also result from the loss of proceeds that would be earmarked for maintenance of the RRF, the preservation of historic maritime structures and training of qualified merchant mariners.

Geology and Soils:

This alternative would have only negligible to slight impacts.

Cultural Resources:

The possible impacts are likely to have already been realized, as the fleet(s) have occupied the site(s) for a number of years. Unless the fleet itself achieves some status as a cultural resource or acquires historical significance, it is unlikely that additional impacts to cultural resources will occur. There would, however, be negative impacts stemming from the loss of revenue which could be used for the preservation of historic maritime structures.

CHAPTER V
RECORD OF DECISION

The Environmental Assessment has been reviewed, and it has been determined for the reasons outlined in the EA and stated below that implementation of any of the alternatives would not be a major federal action significantly affecting the quality of the human environment. The selected course of action is to sell ships for the purpose of scrapping as described in alternatives one and two. Historically, bids for foreign scrapping have been significantly higher than bids for domestic scrapping. Accordingly, alternative two is favored as the preferred alternative, as it is more likely to be responsive to MARAD's mandate under the NMHA to maximize the proceeds from the sale of the vessels. However, the bids offered for the vessels will ultimately determine whether the ships are scrapped under alternative one or alternative two.

The no action alternative is contrary to section 6(c) of the NMHA, which specifically mandates that the Secretary of Transportation dispose of all vessels in the NDRF that are not assigned to the RRF and that are not specifically authorized or required by statute to be used for a particular purpose, and, therefore, is not considered a viable option.

While there may be some local impacts on air, water, and biotic resources in the immediate vicinity of the scrapping sites, they will be consistent with existing use patterns. The environmental conditions at these sites would not noticeably change during the period in which MARAD's ships are scrapped.

Environmental impacts resulting from the sale of vessels for scrapping will be minimized by the use of requirements and control measures to ensure the selection of environmentally competent bidders and adherence to regulatory regimes designed to protect the environment.

Analysis of the technical compliance plans required of bidders in the IFB will assist in the selection of environmentally responsible and competent purchasers. The successful bidder must demonstrate the ability to comply with all applicable workplace standards and practices as described in the IFB. A pre-award survey, conducted by qualified personnel, will ascertain the bidder's ability to comply.

Adherence to environmental laws and regulations will minimize any environmental impacts. In the U.S., the handling, transportation and disposal of hazardous and other wastes is regulated and must be managed by permitted facilities. In the case of foreign scrapping, all hazardous materials that are not part of the ships structure and all PCBs, with the exception of applied oil-based paint, must be removed in the U.S. In the event that paint containing regulated quantities of PCBs remains on the vessel, the importing countries will be notified prior to export.

As Parties to the Basel Convention, importing countries are required to have a regulatory regime that will mitigate any environmental impacts by ensuring that hazardous and other wastes resulting from the scrapping process are handled and disposed of in an environmentally

sound manner. Furthermore, NDRF vessels, which will be the cleanest vessels to be scrapped in foreign yards after their domestic clean up, will be an insignificant percentage of the vessels scrapped in foreign yards.

Actions taken and documentation provided concerning this course of action will be periodically reviewed. Sale of NDRF vessels for scrapping will continue, provided events are progressing as anticipated.

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